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CROSS-SECTORAL ISSUES

The relationship between demographic trends economic growth, unsustainable consumption patterns and environmental degradation

Report of the Secretary-General of the Conference

I. INTRODUCTION

1. The Preparatory Committee, at its second substantive session, in its decision 2/6 requested the Secretary-General of the Conference to continue to study the interrelationship between environment and development, taking into account decision 1/25 of the Committee at its first session, which identified main elements of this relationship. The present report was prepared in response to this decision.

2. In preparing this report the UNCED Secretariat utilized contributions commissioned from the Ecological Systems Analysis Group, of Argentina Pontificia Universidade Catolica de Rio de Janeiro, of Brazil, the Indira Gandhi Institute of Development Research of India, and the Institute of World Economy and International Relations of the USSR Academy of Sciences. A study was contributed by the World Resources Institute, of the United States. Many other sources of information were also consulted.

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II. BACKGROUND

3. The pressure of human activities impinges on the environment essentially through the use that humans make of the environment for meeting their consumption needs. These demands on the environment are function of per capita consumption standards and the number of people. These in turn are determined by value systems and other socio-cultural factors, and by income levels and other economic factors. In order to understand the links between growth and environmental degradation, it is necessary to look simultaneously at demographic developments and consumption patterns, in the context of value systems technological developments and policy orientations which help or hinder efficiency of resource use. The present report will review these issues and address main policy conclusions.

III. DEMOGRAPHIC TRENDS

4. Population growth has been sustained since the period of the Industrial Revolution. There has, however, been a recent acceleration since the 1950's, following a sharp reduction of mortality rates in developing countries. From 1950 to 1990 world population grew from 2.5 to over 5 billions, at an annual rate of 1.9 per cent. These overall figures cover important variations among regions and country groupings.

5. In developed countries, which account for 1.2 billion people, fertility rates have abated and population growth is slow, stabilization has occurred in a number of countries. As a result of this trend, the population of developed countries is gradually aging, which has various consequences such as financial pressures on the pension arrangements. The trend towards urbanization which characterized the period from 1950 to 1980 and led to an average proportion of urban population exceeding 70 per cent in developed countries has now almost stabilized and is not expected to change significantly.

TABLE 1A. Population Growth rates of the less developed regions

	1950-1955	1985-1990	2020-2025
Africa			
Eastern Africa	2.3	3.2	2.1
Middle Africa	1.8	3.0	2.2
Northern Africa	2.3	2.7	1.3
Southern Africa	2.3	2.4	1.4
Western Africa	2.3	3.2	2.0
Latin America			
Caribbean	1.8	1.5	1.0
Central America	2.9	2.3	1.3
South America	2.8	2.0	1.1
Asia			
Eastern Asia	1.8	1.3	0.4
South-eastern Asia	1.9	2.1	1.0
Southern Asia	2.0	2.3	1.1
Western Asia	2.7	2.8	1.7

Source: **World Population Prospects 1990** (United Nations publication, forthcoming).

TABLE 1B. Percentage of population living in urban areas and urban population, 1990-2025

Region	Urban areas (percentage)			Urban population (in millions)		
	1990	2000	2025	1990	2000	2025
World total	45	51	65	2.4	3.2	5.5
Less developed regions	37	45	61	1.5	2.3	4.4
More developed regions	73	75	83	0.9	0.9	1.1

Source: **World Urbanization Prospects 1990** (United Nations publication, forthcoming).

6. In developing countries, which account for 4.1 billion people, both birth and death rates have dropped, but to a lesser and differentiated extent, as is shown in Table 1A. Population growth rates continue to be substantial in various developing regions.

7. These fast growing populations will lead to a changing population structure in the years ahead: a labour force growing overall at a rate of 2.3 per cent until the year 2000, (varying from 1.2 per cent a year in China, through 2 per cent in South Asia and East Asia, 2.4 per cent in Latin America, to 3 per cent and over in West Asia and Africa) and a child-dependency ratio which will range from 70 per cent in West Asia and sub-saharan Africa, though 50-60 per cent in Latin-America, South Asia and North Africa, to about 40 per cent in East Asia. The trend towards urbanization has been gaining momentum, and is expected to continue well into the 21st century, until urban population rates in developing countries, as is shown in table 1B reach levels over 60 per cent. This urbanization trend has led to the development of megacities of several million inhabitants. Providing adequate shelter and employment opportunities for rapidly increasing urban population is a great challenge. (See Human Settlements, ...)

8. World population is projected to reach 6.3 billion in 2000, and approximately 8.5 billion in 2025 according to the medium variant projections of the United Nations. Depending on how population programmes will be successful, it could reach 10 million or more by the first quarter of the next century. It could eventually stabilize, depending on how fast fertility rates are reduced, between 2050 and 2100, at levels between 10 and 14 billion. Most of the population increase (over 90 per cent) is to take place in presently developing countries and most of it in cities. Coping with this urban explosion will be a primary challenge of the 21st Century.

IV. ECONOMIC GROWTH

9. Economic growth has reached an unprecedented scale in this century. It is estimated that global GDP was in the order of $US 600 billion in 1900. It was about $US 5 trillion in 1960 and about $US 17 trillion in 1988, the world economy having grown at an average annual rate of 3.64 per cent over the 1960-1988 period. For developed market economies, the growth rate was

3.5 per cent over the period, and for developing countries 4.26 per cent. Among developing countries, regional rates were 3.25 per cent in Africa (2.53 per cent in Sub-Saharan Africa, 4.58 per cent in North Africa), 3.84 per cent in Latin America, 6.02 per cent in South and South-East Asia, 3.31 per cent in West Asia.

10. Growth rates declined in recent decades. Table 2 shows rates of economic growth in the various region during the 1970's and 1980's. Per capita output fell in the 1980's in many developing countries of Latin America and Africa.

Table 2: Growth of world output, 1971-1990, per capita GDP and share of world population by country groups

	Growth of GDP (annual rate)		GDP per capita (US dollars) a/		Share of world population 1990 (per cent)
	1971-1980	1981-1990	1980	1990	
Developed market economies	3.1	2.6	10 200	12 500	15.6
Eastern Europe and the Soviet Union b/	5.2	2.5	3 200	3 800	7.8
Developing coutries	5.6	3.2	760	850	76.7
Africa	4.9	0.5	750	580	11.7
Western hemisphere	5.5	1.0	2 320	2 090	8.5
South and East Asia	5.8	7.0	380	570	52.4
China	5.9	9.0	290	610	21.7
West Asia	6.5	0.2	4 180	3 000	2.5
Mediterranean	5.3	3.2	1 940	2 210	1.5
World	3.9	2.9	...	...	100.0

Source: **Department of International Economic and Social Affairs of the United Nations Secretariat.**

a/ In 1980 prices.

b/ Net material product.

11. As a result of these growth trends, developed and developing countries accounted in 1988 for $US 14.71 trillion and $US 2.48 trillion in the $US 17.19 trillion world GDP. Their shares in global economic output were respectively over 85 per cent and under 15 per cent, while their shares in world population were 23.3 per cent and 76.7 per cent. The gap in per capita output has been widening during the 1980s. The ratio between per capita output in developed market economies and developing countries was 13.42 in 1980 and 14.7 in 1990.

12. Long-term economic growth predictions do not have a record of great accuracy. It is envisaged on the basis of observed trends that the world economy could grow fivefold by the middle of next century.

13. While growth of economic activity has brought substantial social benefits and improved the welfare of many in some regions, the situation of developing countries continues to be characterized by considerable poverty: out of approximately 4 billion people in developing countries, over 1 billion live below the poverty line; more than 150 million children are malnourished; over 1,750 million adults are illiterate; some 1,500 million people have no access to health services, 2,800 million people have no access to sanitation (UNDP's Human Development Report 1990). Among the disadvantaged, the situation of women and children, who are subjected to the worst deprivations, should be stressed. The situation of indigenous peoples, who are often marginalized and deprived of access to power, should also be noted. It is urgent to improve living standards in developing countries, and the required economic development will involve accelerated economic growth.

14. Overall economic growth represents the aggregation of activities in the various economic sectors. The level and pattern of resource use in the different sectors generates a variety of environmental problems which are the issues identified in General Assembly resolution 44/228. The manner in which selected sectors of human activity affect the environment is briefly outlined below. This description should be read in the context of the more detailed analysis presented in the background documents submitted to the Preparatory Committee.

(a) Agriculture

15. Through its process of soil use and alteration of the vegetation cover, agriculture has an impact on the soil in modifying its structure and composition, and on the flora and fauna it supports. In a number of ways, agriculture has a positive influence on the environment, for instance through drainage systems and its effects on flood control and water quality. Many traditional agricultural practices contribute substantially to the preservation of the environment. At the same time, the introduction of chemicals to the land affects the food chain, water systems and the air. Agricultural malpractices may lead to soil degradation through erosion, salinization, compaction and pollution. Increasing intensity of agriculture may also cause loss of biodiversity.

(b) Forestry

16. Forest management can have beneficial effects on the environment however detrimental effects may be generated if the forest cover protecting a fragile soil is affected, for instance on steep slopes. The ground may become waterlogged or otherwise impoverished. The regulatory effect of forests in water catchment areas, which helps better infiltration of rain and snowfall and reduces flood levels, may also be diminished. Forest exploitation may also reduce the diversity of tree species and such simplified ecosystems offer fewer niches for wild life.

(c) Fisheries

17. Marine fisheries provide 10 to 20 per cent of world protein intake. Properly managed such a contribution would be sustainable. But in recent years global fishery harvests were on average about 85 per cent of the

estimated maximum sustainable yield and on an increasing trend. Overfishing has depleted individual species in the past and has, in some regions, deprived people of the income and food derived from this resource. The resource is also threatened, particularly in coastal areas, by pollution.

(d) Industry

18. Among industries, a few sectors play an especially important role in most raw materials consumption and pollution. The agro-food industry, mining and reprocessing, cement production, pulp and paper processing, oil refineries and chemical industries are among such sectors. Industries have a substantial role in row materials and energy consumption, water consumption, emissions of nitrogen oxide and sulphur oxide emissions, emissions of greenhouse gases, pollution of water through biological oxygen demand and suspension substances release, generation of non-inert waste and the discharge of toxic substances. The rate of innovation which results in fast product diversification of products complicates the issue as it is difficult to predict the possible environmental impacts of the large number of new substances produced especially in the chemical industry. Risks related to accidental discharges of toxic substances cause considerable concern, as does the inclusion of hazardous substances in products of industry which are marketed, utilized and have to be ultimately disposed of.

(e) Transport

19. Transport services are necessary for the development of other economic activities and represent a substantial share of economic output. They have numerous environmental consequences: emission of air pollutants involving health risks in cities and ecological impacts at regional level. Transport are responsible for a considerable share of CO, NOx, hydrocarbons, benzene and atmospheric lead emissions, as well as for CO2 and CFC emissions. Land utilization for transport infrastructures, the related rubble disposal and the recycling of metals from decommissioned vehicles also constitute environmental issues. Pollution of marine environment through oil discharge and the risks posed by the transport of hazardous substances are another instance of environmental impact as is consumption of energy (see below) metals and other non-fuels by the transport sector. A high death toll results from transport accidents, mainly road transport. Noise pollution and traffic congestion should also be mentioned.

(f) Energy

20. Energy supplies are necessary for the development of other economic activities. The energy sector performs extraction, conversion, transport and consumption of energy and disposes of energy wastes. Energy sources include coal and other solid fuels, oil, gas, nuclear power, hydropower and other renewable sources of energy, as well as electricity. Issues related to energy use are mentioned in the discussion of other economic sectors above. While important advances have taken place in energy efficiency of numerous economic activities and in the fuel - efficiency of vehicles, the operation of the energy sector continues to generate considerable environmental impacts such as, the emission of CO2 and other "greenhouse gases", the emission of SOx, NOx and hydrocarbons, the generation of radioactive waste, the risks of nuclear

reactor accidents decommissioning problems in the nuclear power industry, deforestation due to firewood consumption, health risks to workers in energy industries (coal mines, oils fields, nuclear reactors, etc...), oil spills, land use issues related to mining, solid waste disposal from various energy-related installations, etc.., so that a solution to the energy related environmental impacts would constitute an important step towards sustainable development.

(g) Human Settlements and Tourism

21. The importance of human settlements for the environment hardly needs to be stressed. The issue is addressed in detail in the report contained in document A/CONF.151/PC/56. Its relationship with land-use, transport needs and energy consumption is evident. Human settlements are also strongly linked to patterns of atmospheric and water pollution, both of marine and fresh water resources. Explosive urban growth underway in developing countries makes human settlements a central issues for impacts of human activities on the environment. Tourism, which also grows in an accelerated manner, represents a form of human settlements, whose effect is compounded by its often intermittent and seasonal character, so that the imbalance between infrastructures for environmental protection and peak pressures tends to be even more pronounced than in urban areas. Its impacts on coastal and mountain environments should be particularly noted.

(h) Military Activities

22. The relationship between the military sector and the environment deserves a special mention. Beside the very large financial resources devoted to it, (probably in the 3 to 5 per cent range of global GDP), this sector has important environmental impacts which are related to its operating mode, destruction power being a fundamental characteristic and the ability to generate negative impacts on humans and their environment a criterion of effectiveness. In addition to its claim on land use, its consumption of energy and various other non-renewable resources, including many rare metals, the military sector concentrates the use of toxic, radioactive and other dangerous substances. Environmental protection rules can at best be internally applied, as secrecy prevents the identification and correction of many negative impacts on the environment. Emission standards do not apply to weapons systems. It should be noted in this context that many military tests are conducted in sparsely populated areas which are the habitat of indigenous peoples. The negative ecological impact in peace time is substantial. In war time, destruction is the goal. There is, first of all, the toll in human lives: several hundred thousand this year alone in various armed conflicts. Massive devastation caused by World War II, the use of defoliants in subsequent conflicts, the recent use of oil spills and oil well fires as tactical actions and the impact on economic infrastructure described as near-apocalyptic by a recent United Nations report are but a few examples of the effects of wartime military operations on environment and development.

V. ENVIRONMENTAL DEGRADATION AND CONSUMPTION PATTERNS

23. Humans have always modified the environment in order to meet their needs. Such modifications in themselves do not constitute environmental problems. Problems arise when the nature and extent of the modification is such that it compromises the ability of other groups to meet their needs, where these other groups could be future generations. It could also be that the way in which one particular need, let us, say, for energy, is met, compromises the ability to fulfill some other need, say, for good health.

24. In recent years, the scale and depth of human interventions in nature are increasing and the pace of change is also accelerating. The rising scale of intervention can be seen in the proportion of freshwater diverted for human use, in the level of energy use, in the growth of megacities, etc. The increasing depth of interventions in nature is illustrated by human interventions in the development of plant varieties which has progressed from selective breeding of naturally found varieties, to cross-breeding and hybridisation and now to genetic manipulation. With the growth of the chemicals and synthetics industry, pressures on the natural environment in one sense may have reduced but in another sense, the depth of intervention in nature has increased as natural systems have to cope with exotic substances leading often to problems of toxicity and hazard. All of this is leading to environmental problems which cannot be managed sufficiently on an ad hoc basis by an individual decision maker or even by a local community. There are some effects which are essentially global and regional in character, like the risks of climate change, the depletion of the ozone layer, transboundary air pollution, marine pollution, depletion of marine resources, etc. There are certain others like a loss of biodiversity or of forest cover, which though local in character, could have larger consequences. More localised problems of land degradation, air and water pollution are now found in so many localities that they in effect have to be treated as national, regional and global issues. A detailed analysis of these effects is presented in background documents submitted to the Preparatory Committee.

25. Rising demands, human interventions in natural systems will continue to increase. It is necessary that we recognise that such interventions must respect certain limits at the local, national and global level and, in the words of the report of the World Commission on Environment and Development, "long before these are reached, the world must ensure equitable access to the constrained resource and reorient technology efforts to relieve the pressure".

C. Consumption and waste generation patterns

26. An important determinant of the scale and depth of environmental impact is consumption, which influences production levels and determines environmental impacts resulting directly from consumption. Besides, as many commodities are internationally traded, consumption is a better indicator than production of the final destination of natural resource inputs into the economy.

27. Global consumption has skyrocketed in the last decades, driven by consumption in the industrialized countries. Since the 1950s, consumption of copper, energy, steel, meat and wood has about doubled. Cement use and

automobile ownership have quadrupled. Use of plastics and aluminum has grown respectively five and seven-fold. Air travel has been multiplied by over thirty times. This fast growing consumption has generated increasing quantities of waste. It is estimated that worldwide annual emissions of sulfur dioxide have grown by over 400 per cent and nitrogen oxides by over 900 per cent in this century, reaching respectively levels of over 60 and 20 million metric tons a year. Emissions of carbon dioxide are estimated to have increased ten-fold in this century. Increasing problems and costs related to solid waste disposal are an indication of increasing quantities generated. Aluminum and plastics included in packaging constitute an increasing share, in weight and volume, of municipal waste. Along with such waste, new substances toxic in small amounts have been and continue to be developed at a rate that exceeds the possibilities of testing and regulation. Pesticides, whose very toxicity is the reason for their release pose important problems.

28. In developed market economies, a number of consumer durables - automobiles, refrigerators, vacuum cleaners, washing machines, dishwashers, stereo equipment, televisions, air-conditioning in appropriate climates - are now found in most households. Others - video cassette recorders, microwave ovens - are in the process of wide dissemination. Agricultural products such as vegetables, fruits and flowers are now transported over long distances, sometimes flown intercontinentally, in order to supply affluent markets. Intercontinental trade of beverages, including bottled water, is also widespread. Such consumption patterns serve as a model worldwide, promoted, inter alia, by universally distributed television programmes, and are adopted by the affluent in developing countries and countries in transition to a market economy.

29. The consumption patterns of specific commodities by different country groupings shows a more complex and differentiated picture. There is, for instance, a marked contrast between consumption patterns in developed and developing countries for commodities such as food and wood-based products, which affect land resources, or textiles, fertilizers, cement, metals, energy resources and vehicles, which are essential to major manufacturing and transport activities, with linkages to the atmosphere, mineral resources, the marine environment, and solid wastes.

30. Generally, consumption in developed countries largely exceeds that in developing countries, both in per capita and in absolute terms. Per capita consumption of milk and meat, sawnwood, paper, metals, coal and liquid fuels in developed countries is more than five times higher than in developing countries. For the availability of road transport vehicles, the factor is more than 10. For cement, fertilizers and textiles, the ratio is between 3 and 5. For cereals, it is below 3 and fuelwood is one case where per capita consumption in developing countries is estimated to exceed that in developed countries. In absolute amounts, cereals and fuelwood are two natural resources for which consumption of developing countries exceeds that of developed countries. For other commodities mentioned above,the consumption of developed countries is well above that of developing countries. It is more than double for metals and liquid fuels. Data on waste generation are not generally available, but regarding gross carbon dioxide (C02) emissions, it has been computed that shares in current (1988) emissions are about two-third

and one-third for developed and developing countries respectively, and that per capita emission levels are on average about 8 times higher in developed than in developing countries. For cumulated C02 emissions over the 1950-1988 period, the share of developed countries is estimated to amount to over 70 per cent (see tables 3 - 6).

Table 3: Consumption Patterns of Developed and Developing Countries for Selected Products

Products	Year	World total	% Share in World		Per capita consumption (kg)		ADR
			Dvlpd	Dvlpg	Dvlpd	Dvlpg	Dvlpd/Dvlpg
1. Consumption of land based products							
Food Products (MMT)							
. Cereals	1987	1801.33	47.6	52.4	716.7	246.6	2.9
. Milk	1987	532.88	71.7	28.3	319.5	39.4	8.1
. Meat	1987	113.51	63.8	36.2	60.6	10.7	5.7
Forest Products (MMT)							
. Round Wood	1988	2410.15	45.5	54.5	887.6	338.6	2.6
. Sawn Wood	1988	337.99	77.9	22.1	213.2	19.2	11.1
. Paper & Paperboard	1988	223.69	81.3	18.7	147.8	10.6	13.9
2. Consumption of industrial products associated with basic needs							
. Fertilizers	1987	140.52	59.6	40.4	70.1	14.8	4.7
. Cotton & Wood Fabric	1983-85	29.88*	47.0	53.0	15.6**	5.8**	2.7
. Cement	1987	1035.65	52.0	48.0	450.9	129.6	3.5
3. Consumption of Metals + Minerals							
- Metals	1987	10.35	85.5	14.5	7.4	0.4	20.6
. Copper	1987	699.14	80.2	19.8	469.3	36.1	13.0
. Iron & Steel	1987	21.63	85.6	14.4	15.5	0.8	19.1
. Aluminium							
- Minerals:							
. Chemical Products	1983-85	225.6	87.1	12.9	162.5	8.0	20.3
. Inorganic Chemicals	1983-85	391.23	84.8	15.2	274.1	16.4	16.7
. Organic Chemicals							
4. Availability of transport Vehicles	1986	370.2	91.5	8.5	0.283	0.012	23.6
. Cars	1986	105.2	85.1	14.9	0.075	0.006	12.5
. Commercial Vehicles							

* (bm^2) billion square metres
** m^2

Table 4: Availability of Transport Vehicles

Products	Year	World Total	% Share in World		Relative Per capita		ADR Dvlpd/ Dvlpg
			Dvlpd.	Dvlpg.	Dvlpd.	Dvlpg.	
Cars	1986	370.2	91.5	8.5	0.283	0.012	23.6
Commercial Vehicles	1986	105.2	85.1	14.9	0.075	0.006	12.5

Table 5: Consumption of Fuels and Electricity for 1988
Tonnes of Oil Equivalent

Item	World Total (MMT)	% Share in World		Per capita consumption (kg)		ADR Dvlpd/ Dvlpg
		Dvlpd.	Dvlpg.	Dvlpd.	Dvlpg.	
Solid	2309.12	66.3	33.7	1278.3	198.9	6.4
Liquid	2745.65	75.1	24.9	1719.6	174.6	9.8
Gas	1611.35	85.2	14.8	1146.5	60.8	18.9
Electicity	343.13	80.5	19.5	230.4	17.2	13.4
Total	7009.25	74.8	25.2	4376.2	452.8	9.7
Diesel	756.67	71.6	28.4	452.4	54.9	8.2
Gasolene	725.5	81.9	18.1	495.8	33.6	14.7
Electricity (Thermal)	7040.3 (BKWH)	77.9	22.1	4574 (KWH)	397 (KHW)	11.5
Electricity (Total)	11017	78.9	21.1	7260	598.8	12.2

Table 6: Shares in Global Emissions of CO_2 in 1988

Item	World Total (Biln. MT of C)	Share Dvlpd. (%)	Share Dvlpg. (%)	Per Capita Dvlpd.	Per Capita Dvlpg.	ADR Dvlpd./ Dvlpg.
Total Emissions	5723.6	70.3	29.7	3.36	0.43	7.81
Cum. Total Emissions (50-88)	112060.7	77.2	22.9			
Solid	2413.8	63.7	36.3	1.31	0.22	6.05
Liquid	2205.5	69.8	30.2	1.33	0.16	8.52
Gas	907.5	81.9	18.1	0.62	0.03	18.46
Flaring	47.9	25.2	74.8	0.01	0.01	1.28
Cement	148.8	48.8	51.2	0.06	0.02	3.26

VI. POLICY IMPLICATIONS

31. It appears therefore that consumption patterns in developed countries have a leading role in rapid depletion of non-renewable mineral and fuel resources, oceans pollution, land overuse and the emission of greenhouse gases. Environmental stress is generated in developing countries through two processes. A form of stress is generated by activities of the modern sector mainly in agriculture, industry and transports, which resembles that of developed countries in a smaller overall scale, thereby contributing only in a limited manner to global environmental stress, but may have acute local environmental impacts compounded in many cases by inferior environmental protection actions taken. This is particularly the case in many large cities of developing countries, where pollution levels often greatly exceed those of cities of comparable size in developed countries as well as guidelines and standards. Migration and concentration of population in coastal areas lead to forms of environmental stress detailed in the report on coastal development and enclosed seas, marine pollution, living marine resources and impacts of climate change contained in document A/CONF.151/PC/69. Another type of environmental stress is generated by poverty - urban and rural - which involves overuse of fragile land resources, deforestation, sometimes ultimate desertification through processes which are described in the report on Poverty and Environmental Degradation contained in document A/Conf.151/PC/45.

32. Rapid population growth in developing countries has not been accompanied by a commensurate increase in their share in global consumption of many resources and in waste generation. It has, however, contributed markedly to an unsustainable consumption of fuelwood, with a direct linkage with deforestation, and to pressures on coastal environments and other resources. In a number of arid countries, there is a growing imbalance between water supplies and water needs, which are related to population. Most of all, rapid population growth has acted as a brake on economic growth by diverting resources away from investment and hampering efforts to raise per capita income, education, and other ingredients of development.

33. On the basis of the definition of sustainable development given by the World Commission on Environment and Development: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs". It is clear that trends and patterns discussed above are not sustainable:

34. "The needs of the present" are far from being met, as over 1 billion people live below the poverty line, as indicated in paragraph 13 above. Global environmental threats, such as the depletion of the ozone layer, the risks of climate change, loss of biodiversity and the degradation of oceans, are clear cases of compromising the ability of future generations - worldwide - to meet their own development needs. Local environmental degradation, health impacts of pollution in cities, "acid rain" degrading forests and water supply, land degradation reducing agricultural yields, gradual depletion of non-renewable resources, even if they do not threaten equally all the human species, also compromise the ability of future generations to meet their own needs. Corrective actions are therefore

urgently needed. In addition to sectoral actions which are described in the relevant sectoral documents, conclusions regarding population trends, economic growth and consumption patterns are outlined below:

35. Concerns regarding the needs of future generations cannot be understood without a firm commitment to alleviating hardships suffered by present generations. Extreme poverty must be eliminated and living standards in currently developing countries have to be improved. In particular, nutrition, health, education and housing standards must be substantially raised. Special efforts must be made in this regard to remove the gender bias. The marginalized status of indigenous peoples should be corrected. These actions need not translate into commensurate increase in per capita output. As shown in the Human Development Report (1991) of UNDP, some improvements can be achieved through resource redeployment. However, the increase in per capita output, even if not in proportion to the improvement of living standards, will have to be important and will cause - technology assumed to remain constant - increased environmental impacts.

36. There is a need to stabilize global population as soon and at as low a level as possible. In each country, a balance should be established between population, resources and development needs. The reduction of population growth in developing countries will facilitate their economic growth and the improvement of living standards. The stabilization of world population at as low a level as possible will increase the room for maneuver for establishing an equitable and sustainable world in the next century. If efforts to curb demographic growth are successful, world population would stabilize around 2,050 at about 10 billion, about twice the current number.

37. It is essential to reduce the environmental impact of economic growth. The reduction necessary in order to make possible the improvement of well-being worldwide without increased environmental stress is of a tremendous magnitude. Technological improvements have achieved substantial efficiency increases in the past in specific areas. Economic growth has taken place in a number of developed countries since the mid-70's with no or little increase in energy consumption. In the future, such technological improvements are needed throughout the economic process and at a much faster pace: new production processes, increasingly thrifty in materials use and generating ever-decreasing waste quantities, must be developed and disseminated for widespread use. A balance will have to be found, based on environmental criteria, between the need for such fast evolution and the need for long-lasting, repairable products rather than current disposable short-life items. Packaging will need to be reoriented on the basis of environmental constraints: The utilization of reusable containers must be maximized as well as recycling of used products and packaging.

38. Many technological solutions already exist. Developments in such areas as electronics, telecommunications, new materials, biotechnology and new sources of energy open promising prospects regarding the possibility of progress towards environmentally sounder production and consumption patterns. Full use must be made of economic instruments, regulations and public information in order to bring about needed changes in scientific, technical, productive and consumption systems.

39. Developing countries, where most of population growth will take place, and where substantial economic growth is necessary, will experience considerably increased local environmental pressures and will contribute in an increased manner to global environmental pressures if improved technologies, of which many will be generated in developed countries are not deployed massively in their economic systems. From a global environment perspective, it would therefore be expedient that advanced technological systems be in certain cases deployed first in developing countries, before their widespread use in developed countries is achieved through gradual replacement of existing systems. Vigorous capacity building actions will be needed to improve the ability of developing countries to generate new technologies and to adapt and utilize technologies developed elsewhere.

40. It is clear that current lifestyles and consumption patterns of the affluent middle-class of some developed countries, involving high meat intake, consumption of large amounts of frozen and "convenience" foods, ownership of motor-vehicles, numerous electric households appliances, home and workplace air-conditioning, widespread air-travel, space - expansive suburban housing, motorized commuting and shopping, are not sustainable. Such lifestyles are shared by the affluent in developing countries and exert irresistible attraction on all. However, even after substantial efficiency improvements are brought about by technological advances, they would probably not be sustainable for a population of 10 billion. A shift is therefore necessary towards lifestyles providing substantial well-being while less geared to resource-intensive and environmentally damaging consumption patterns by emphasising quality over quantity. Such lifestyle changes will be difficult to bring about: they would require a reversal of current trends which have a strong momentum; they would go against the perceived short-term interest of important constituencies: the advertising industry, many consumer goods and services sectors would be adversely affected in the short-term; they would also go against conventional economic thinking which emphasizes output growth as the main criterion for progress and success. However, wide differences observable in environmental impacts of developed countries with comparably high living standards suggest that changed lifestyle can achieve considerable environmental progress without loss in well-being. In fact, reduced environmental impact may coincide with improved quality of life.

41. What will be required to achieve such behavior change is a change in the underlying values. The increasing importance of environment issues in national political agendas and the greater awareness of the linkages between consumption patterns and environmental impacts evidenced by the emergence of a market for environmentally friendly products is a hopeful sign in this regard. Environmental education could enhance such emerging trends. Progress achieved in reducing tobacco use in some regions shows how fast changes in perceptions and behaviours can be achieved, even with regard to addictive substances promoted by powerful advertising.

42. Bringing about the necessary changes outlined above in coming decades will require the convergent action of all: public sector, enterprises, NGOs,

as well as the general public. Institutional arrangements providing for the involvement and participation of those concerned at all levels - global, regional sub-regional, national local, even at the level of neighbourhoods, in the making and implementation of decisions would enhance the effectiveness of these actions. Building up the momentum and steering the transition towards equitable eco-prosperity in the 21st century represents the major challenge the world community has to address. UNCED is meant to contribute to this global effort.